

Appln. No. 10/019,967
Amdt. Dated August 29, 2003
Reply to Office Action of May 29, 2003
Attorney Docket No. 6009-4616

REMARKS

Claims 1-18 are currently pending. Claims 1-18 have been amended herein.

Applicants respectfully request reconsideration of the above-identified Application in light of the above amendments and the following remarks.

Claims 1-18 have been amended to conform with current U.S. practice.

Specifically, the phrase "characterized in that" has been replaced with ---wherein--- or ---comprising---, where appropriate. Other amendments have been made to some claims, as can be seen in the above amendments, also to better define Applicants' invention. Support for these amendments is found throughout the Specification and Drawings as filed, for example in each respective claim, as filed.

Claim 1 has been amended to recite, "a method for liquid-liquid extraction of copper from an aqueous solution containing more than about 40 g/l of sulphates the method comprising feeding an organic extraction solution and said aqueous solution into a plurality of extraction stages , said extraction solution containing an extractant extracting copper in said extraction stages from said aqueous solution in the presence of said organic extraction solution...." Claim 1 has been further amended to recite "raising the viscosity of said organic extraction solution to a range of 3 -11 cP and dispersing the aqueous solution into drops in the extraction solution by adjusting the volumetric ratio of the extraction solution to the aqueous solution to between 0.7 - 1.0. Support for these amendments is found throughout the Specification as filed, for example in Claim 1, and at page 7, line 17-page 8, line 12, as filed.

Claims 6, 8, 10 and 12 have been amended to recite “the ratio of the extraction solution and the aqueous solution fed into the extraction stages....” Support for these amendments is found throughout the Specification and Drawings as filed, for example in each respective claim, as filed, in Figure 1, and in the Specification at page 7, line 17-page 8, line 12

Claims 13, 14 and 15 have been amended to recite “aliphatic” hydrocarbons, for the reasons described below in connection with claim rejections under 35 U.S.C. §112.

Claim 18 has been amended to provide antecedent basis for the recited “washing and stripping stages.”

Former Claims 1, 5, 6, 8, 10, 12, 13-15, 16 and 17 have been rejected under 35 U.S.C. §112 as allegedly being indefinite. Former Claims 17 and 18 have been rejected for being in improper dependent form for being multiply dependent claims depending from multiply dependent claims. Claims 15, 17 and 18 have been amended to depend only from amended Claim 1. Thus rendering moot this ground for objection.

Former Claims 16 and 17 have been rejected under 35 U.S.C. §112, second paragraph as being indefinite. Regarding former Claim 1, the Office Action argues that “it is unclear whether the making of a volumetric ratio of extraction solution to aqueous solution is a positively recited method step or a pre-existing condition. Applicants have amended Claim 1 to positively recite “adjusting the volumetric ratio....”

Regarding Claim 5, “solutions” has been changed to ---solution--- in order to be consistent with the terminology of Claims 1 and 3, as suggested by the Examiner. Regarding Claim 6, the Office Action argues that “the recited pumping ratio of ‘0.08 to 0.02’ should apparently be ‘0.08 to 0.2’ to be consistent with claims 8, 10 and 12.” Applicants have amended

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Claim 6 to recite ---0.08-0.2--- in place of "0.08-0.02". Claims 6, 8, 10 and 12 have been rejected for reciting "the external pumping ratio." This recitation has been amended to read "the ratio of the extraction solution and the aqueous solution...." Claims 13-15 have been rejected for reciting "alifatic hydrocarbons, kerosenes." Claims 13 and 14 have been amended to recite only "aliphatic hydrocarbons" and Claim 15 has been amended to recite only "aliphatic and aromatic hydrocarbons."

For the above reasons, all claims, as amended satisfy the requirements of 35 U.S.C. §112. Withdrawal of the rejection applied to former Claims 1, 5, 6, 8, 10, 12, 13-15, 16 and 17 under 35 U.S.C. §112, as being indefinite, is respectfully requested.

Former Claims 1-16 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,173,616 to Koenders et al. in view of U.S. Patent No. 3,666,446 to Cook et al. and U.S. Patent No. 5,015,448 to Vorlop et al.

The main cited reference, Koenders et al., is clearly deficient. Koenders et al. describe a conventional extraction process and the use of certain organic solvents that are capable of liquid-liquid extraction of copper. The Office Action argues that "The aqueous solutions may contain large amounts of sulfates," citing Examples 6-17/column 10, lines 34-38 of Koenders et al. However, the amounts of copper and iron mentioned in examples 6-17 (In addition to copper and iron, Koenders et al. do not mention any other sulfate salts) correspond to a sulfates content of only 10-11 g/l which is not a very significant amount, and certainly does not teach or suggest the use of aqueous solutions with a sulfates content above 40 g/l, as now

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claimed by applicants. Koenders et al. also do not teach or suggest extracting copper in the extraction stages from the aqueous solution in the presence of the organic extraction solution by raising the viscosity of the organic extraction solution to a range of 3 -11 cP and dispersing the aqueous solution into drops in the extraction solution by adjusting the volumetric ratio of the extraction solution to the aqueous solution to between 0.7 - 1.0. Cook et al. and Vorlop et al do not cure the above stated deficiencies of Koenders et al.

Vorlop et al. US 5,015,448, relates to a method for using particulate material for separation of metal cations form aqueous solutions. Particulate material is either in the form of a gel or is encapsulated by a water-insoluble, ion-permeable shell. This means that the process is not a liquid-liquid extraction method, but nearly an ion-exchange method. The Office Action argues that Vorlop et al. teach viscosity adjustment by use of various additives and diluents to a copper extracting solution, that it would have been obvious "to increase the extraction efficiency and phase separation of the extraction as well as imparting an increased degree of extraction selectivity." Office Action dated May 29, 2003, pp. 4-5. The Office Action acknowledges that Vorlop et al. is silent as to the particular "cP" values of 3-11 claimed by applicants, but argues that "increasing of cP values are inherent in Vorlops et al. which teach liberal, unlimited degree of viscosity increasing." Office Action, p.5.

However, Vorlop et al. teach the formation of gels. A person skilled in the art knows that a gel is a form in which the material is more solid than liquid. The viscosity of thick oils can be for example over 1000-2000 cP and the oils are still liquids, not gels. Then the viscosity of a gel cannot be between 3-11 cP. In addition, Vorlop et al. teaches that the gel is

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dispersed as drops in the aqueous solution which does not teach or suggest dispersing the aqueous solution into drops in the extraction solution by adjusting the volumetric ratio of the extraction solution to the aqueous solution to between 0.7 - 1.0.

Cook et al. also relates to a very conventional liquid-liquid extraction method. The Office Action argues that Cook et al. teach an extraction solution in which enhancement of formation of dispersions is suggested at column 5, lines 45-49 and that it would have been obvious to add "amounts of solution ingredients so as to disperse the aqueous solution, as suggested by Cook et al., so as to inhibit the formation of emulsions which would decrease formation of distinct extraction phases." This does not teach or suggest "dispersing the aqueous solution into drops in the extraction solution by adjusting the volumetric ratio of the extraction solution to the aqueous solution to between 0.7 - 1.0" as claimed by applicants. Nor do Cook et al. teach or suggest "feeding an organic extraction solution and an aqueous solution containing more than 40 g/l of sulphates into a plurality of extraction stages" or "extracting copper in the extraction stages from the aqueous solution in the presence of the organic extraction solution by raising the viscosity of the organic extraction solution to a range of 3 -11 cP," as claimed by applicants. Thus, combining Cook et al. with Koenders et al. and Vorlop et al. does not teach or suggest applicants' method as now claimed. Withdrawal of the rejection applied to former Claims 1-16 under 35 U.S.C. §103(a) as being unpatentable over Koenders et al. in view of Cook et al. and Vorlop et al. is respectfully requested.

The dependent Claims 2-16 define patentable subject matter over Koenders et al., Cook et al. and Vorlop et al., alone or in combination, for the same reasons that Claim 1 defines

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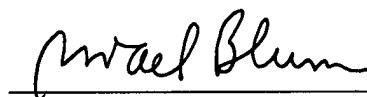
patentable subject matter over this cited art. Dependent Claims 17 and 18 also define patentable subject matter

CONCLUSION

In light of the foregoing, applicant respectfully submits that Claims 1-18, as amended, define patentable subject matter over the cited art, alone or in combination. An early allowance of all claims is earnestly solicited.

Respectfully submitted,

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